

# 8.6

## Area of Trapezoids

**Goal** Find the area of trapezoids.

### VOCABULARY

Height of a trapezoid

### Follow-Up

For each trapezoid below, label the bases  $b_1$  and  $b_2$ . Then label (and draw if necessary) the height  $h$ .



Complete each statement with *always*, *sometimes*, or *never*.

The bases of a trapezoid are \_\_\_\_\_ parallel.

The bases of a trapezoid are \_\_\_\_\_ congruent.

The bases of a trapezoid are \_\_\_\_\_ sides of the trapezoid.

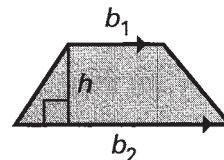
The height of a trapezoid is \_\_\_\_\_ a side of the trapezoid.

The height of a trapezoid is \_\_\_\_\_ perpendicular to both bases.

### AREA OF A TRAPEZOID

**Words** The area of a trapezoid is one half the product of the \_\_\_\_\_ and the sum of the \_\_\_\_\_.

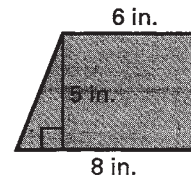
**Symbols**  $A =$  \_\_\_\_\_





**Example 1 Find the Area of a Trapezoid**

Find the area of the trapezoid.

**Solution**

$$A = \frac{1}{2}h(b_1 + b_2)$$

Formula for the area of a trapezoid

$$= \frac{1}{2}(\quad)(\quad + \quad)$$

Substitute  $\quad$  for  $h$ ,  $\quad$  for  $b_1$ , and  $\quad$  for  $b_2$ .

$$= \frac{1}{2}(\quad)(\quad)$$

Simplify within parentheses.

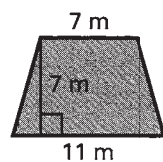
$$= \quad$$

Simplify.

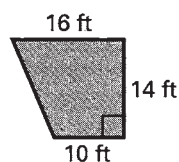
**Answer** The area of the trapezoid is  $\quad$  square inches.

**✓ Checkpoint Find the area of the trapezoid.**

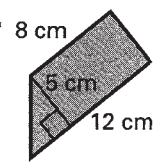
1.



2.



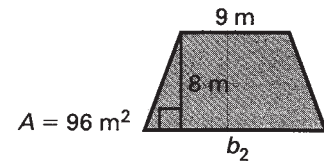
3.





**Example 2** Use the Area of a Trapezoid

Find the value of  $b_2$ , given that the area of the trapezoid is 96 square meters.

**Solution**

$$A = \frac{1}{2}h(b_1 + b_2)$$

Formula for the area of a trapezoid

$$\underline{\hspace{1cm}} = \frac{1}{2}(\underline{\hspace{1cm}})(\underline{\hspace{1cm}} + b_2)$$

Substitute  $\underline{\hspace{1cm}}$  for  $A$ ,  $\underline{\hspace{1cm}}$  for  $h$ , and  $\underline{\hspace{1cm}}$  for  $b_1$ .

$$\underline{\hspace{1cm}} = (\underline{\hspace{1cm}})(\underline{\hspace{1cm}} + b_2)$$

Multiply each side by  $\underline{\hspace{1cm}}$ .

$$\underline{\hspace{1cm}} = \underline{\hspace{1cm}} + \underline{\hspace{1cm}}b_2$$

Use the  $\underline{\hspace{2cm}}$  property.

$$\underline{\hspace{1cm}} = \underline{\hspace{1cm}}b_2$$

Subtract  $\underline{\hspace{1cm}}$  from each side.

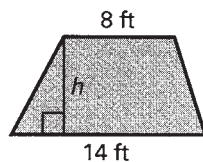
$$\underline{\hspace{1cm}} = b_2$$

Divide each side by  $\underline{\hspace{1cm}}$ .

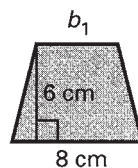
**Answer** The value of  $b_2$  is  $\underline{\hspace{1cm}}$  meters.

✓ **Checkpoint** In Exercises 4–6,  $A$  gives the area of the trapezoid. Find the missing measure.

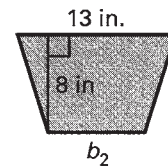
4.  $A = 77 \text{ ft}^2$



5.  $A = 39 \text{ cm}^2$



6.  $A = 84 \text{ in.}^2$



7. A trapezoid has an area of 294 square yards. Its height is 14 yards and the length of one base is 30 yards. Find the length of the other base.



**Follow-Up** Summarize the area formulas you have learned in this chapter. Write the formula, then draw and label a diagram.

Polygon	Area Formula	Diagram
Square		
Rectangle		
Triangle		
Parallelogram		
Rhombus		
Trapezoid		